WHAT IS CLAIMED IS:

1. Apparatus for analyzing fluid supplied to it through a tube, comprising:

(a) an analyzing instrument within an enclosure;

(b) a first connector attached to the tube and having an end face;

(c) a second connector, mating with said first connector and attached to said enclosure;

(d) a pair of optical fibers disposed inside said enclosure, a first end of each of said fibers being mounted in said second connector so that, when said first connector is properly mated with said second connector, there is a clear optical path between the end face of each of said first ends of said fibers and at least one common point on said end face;

(e) a light source optically coupled to the second end of a first one of said pair of fibers; and

(f) a light detector optically coupled to the second end of the second one of said pair of fibers.

2. The apparatus of claim 1, wherein said end face is characterized by essentially specular reflectivity over at least an annular portion thereof that, when said first connector is properly mated with said second connector in any angular orientation, includes all possible ones of said at least one common point.

3. The apparatus of claim 2, wherein said analyzing instrument or any components thereof are operative only upon reception of an enabling signal and further comprising an electric circuit connected to said light detector, said circuit being configured so that only if a substantial portion of any light emitted from said first end of one of said fibers is reflected by said annular portion of said end face into said first end of the other one of said fibers, will said circuit output said enabling signal to said analyzing instrument.

4. The apparatus of claim 1, wherein said light source emits light in an essentially narrow band of wavelengths and further comprising an optical filter, essentially transmissive

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to said band of wavelengths and disposed in the path of the light transmitted through said second one of said pair of fibers.

5. The apparatus of claim 1, wherein said end face is coated with a fluorescent or phosphorescent material over at least an annular portion thereof that, when said first connector is properly mated with said second connector in any angular orientation, includes all possible ones of said at least one common points.

6. The apparatus of claim 5, wherein said light source emits light in a first band of wavelengths, such that stimulate said fluorescent or phosphorescent material to emit light in a second band of wavelengths, and further comprising an optical filter, essentially transmissive to at least one wavelength of said second band and disposed in the path of the light transmitted through said second one of said pair of fibers.

7. The apparatus of claim 6, wherein said fluorescent or phosphorescent material is one of a plurality of types, characterized in that said second band of wavelengths has a spectral profile essentially different among said plurality of types, and wherein said optical filter is essentially transmissive to one or more wavelengths at which said one of said plurality of types emits strongly and substantially attenuative to wavelengths at which any other of said types emits strongest.

8. The apparatus of claim 5, wherein said analyzing instrument or any components thereof are operative only upon reception of an enabling signal and further comprising an electric circuit connected to said light detector, said circuit being configured so that only if a substantial portion of any light emitted from said fluorescent or phosphorescent material is collected by said first end of said second one of said fibers, will said circuit output said enabling signal to said analyzing instrument.

9. The apparatus of claim 8, wherein said light source emits light as a first train of pulses and said circuit further includes a synchronous detector that is fed with a multiplying signal formed as a second train of pulses, the two trains of pulses having equal rates and said second train being delayed with respect to said first train.

10. The apparatus of claim 1, wherein said light source emits light in pulses.

11. A system for verifying the proper connection of a tube assembly to a fluid analyzing instrument and for classifying the connected tube assembly, the connection being effected by means of a first connector, which is part of the tube assembly and has an end face, and a second connector, mating with the first connector and attached to an enclosure that encloses the analyzing instrument, the system comprising:

(a) a pair of optical fibers disposed inside the enclosure, a first end of each of said fibers being mounted in the second connector so that, when the first connector is properly mated with the second connector, there is a clear optical path between the end face of each of said first ends of said fibers and at least one common point on the end face;

(b) a light source optically coupled to the second end of a first one of said pair of fibers; and

(c) a light detector optically coupled to the second end of the second one of said pair of fibers.

12. The system of claim 11, wherein the end face is made to have essentially specular reflectivity over at least an annular portion thereof that, when the first connector is properly mated with the second connector in any angular orientation, includes all possible ones of said at least one common point.

13. The system of claim 12, further comprising an electric circuit connected to said light detector, said circuit being configured so that only if a substantial portion of any light emitted from said first end of one of said fibers is reflected by said annular portion of the end face

into said first end of the other one of said fibers, will said circuit output an enabling signal to the analyzing instrument.

14. The system of claim 11, further comprising an optical filter, transmissive to an essentially narrow band of wavelengths and disposed in the path of the light transmitted through said second one of said pair of fibers.

15. The system of claim 11, wherein the end face is coated with a fluorescent or phosphorescent material over at least an annular portion thereof that, when the first connector is properly mated with the second connector in any angular orientation, includes all possible ones of said at least one common points.

16. The system of claim 15, wherein said light source emits light in a first band of wavelengths, such that stimulate said fluorescent or phosphorescent material to emit light in a second band of wavelengths, and further comprising an optical filter, essentially transmissive to at least one wavelength of said second band and disposed in the path of the light transmitted through said second one of said pair of fibers.

17. The system of claim 16, wherein said fluorescent or phosphorescent material is one of a plurality of types, characterized in that said second band of wavelengths has a spectral profile essentially different among said plurality of types, and wherein said optical filter is essentially transmissive to one or more wavelengths at which said one of said plurality of types emits strongly and substantially attenuative to wavelengths at which any other of said types emits strongest.

18. The system of claim 15, wherein the analyzing instrument or any components thereof are operative only upon reception of an enabling signal and further comprising an electric circuit connected to said light detector, said circuit being configured so that only if a substantial portion of any light emitted from said fluorescent or phosphorescent material is

collected by said first end of said second one of said fibers, will said circuit output the enabling signal to the analyzing instrument.

19. The system of claim 18, wherein said light source emits light as a first train of pulses and said circuit further includes a synchronous detector that is fed with a multiplying signal formed as a second train of pulses, the two trains of pulses having equal rates and said second train being delayed with respect to said first train.

20. The system of claim 11, wherein said light source emits light in pulses.

21. A method for verifying the proper connection of a tube to a fluid analyzing instrument and for classifying the connected tube, the connection being effected by means of a first connector attached to the tube and having an end face and a second connector, mating with the first connector and attached to an enclosure that encloses the analyzing instrument, the method comprising the steps of:

(a) providing a pair of optical fibers disposed inside the enclosure, a first end of each of said fibers being mounted in the second connector so that, when the first connector is properly mated with the second connector, there is a clear optical path between the end face of each of said first ends of said fibers and at least one common point on the end face;

(b) providing a light source optically coupled to the second end of a first one of said pair of fibers; and

(c) providing a light detector optically coupled to the second end of the second one of said pair of fibers.

22. The method of claim 1, further comprising the step of making the end face have essentially specular reflectivity over at least an annular portion thereof that, when the first connector is properly mated with the second connector in any angular orientation, includes all possible ones of said at least one common point.

23. The method of claim 22, further comprising the step of providing an electric circuit connected to said light detector, said circuit being configured so that only if a substantial portion of any light emitted from said first end of one of said fibers is reflected by said annular portion of the end face into said first end of the other one of said fibers, will said circuit output the enabling signal to the analyzing instrument.

24. The method of claim 21, further comprising the step of providing an optical filter, transmissive to an essentially narrow band of wavelengths and disposed in the path of the light transmitted through said second one of said pair of fibers.

25. The method of claim 21, whereby the end face is coated with a fluorescent or phosphorescent material over at least an annular portion thereof that, when the first connector is properly mated with the second connector in any angular orientation, includes all possible ones of said at least one common points.

26. The method of claim 25, whereby said light source is made to emit light in a first band of wavelengths, such that stimulate said fluorescent or phosphorescent material to emit light in a second band of wavelengths, and further comprising the step of providing an optical filter, essentially transmissive to at least one wavelength of said second band and disposed in the path of the light transmitted through said second one of said pair of fibers.

27. The method of claim 26, whereby said fluorescent or phosphorescent material is chosen to be one of a plurality of types, characterized in that said second band of wavelengths has a spectral profile essentially different among said plurality of types, and whereby said optical filter is made to be essentially transmissive to one or more wavelengths at which said one of said plurality of types emits strongly and substantially attenuative to wavelengths at which any other of said types emits strongest.

28. The method of claim 25, further comprising the step of providing an electric circuit connected to said light detector, said circuit being configured so that only if a substantial portion of any light emitted from said fluorescent or phosphorescent material is collected by said first end of said second one of said fibers, will said circuit output the enabling signal to the analyzing instrument.

29. The method of claim 28, whereby said light source is made to emit light as a first train of pulses, said circuit is made to include a synchronous detector and said synchronous detector is fed with a multiplying signal formed as a second train of pulses, the two trains of pulses having equal rates and said second train being delayed with respect to said first train.

30. The method of claim 21, whereby said light source is made to emit light in pulses.

31. A tube assembly for connection to a fluid analyzing instrument, comprising a connector having an end face, wherein said end face is formed to have essentially specular reflectivity over at least an annular portion thereof.

32. A tube assembly for connection to a fluid analyzing instrument, comprising a connector having an end face, wherein said end face has a fluorescent or phosphorescent material over at least an annular portion thereof.

33. The tube assembly of claim 32, wherein said fluorescent or phosphorescent material is any one of a plurality of types, characterized by different spectra of emission.

34. The tube assembly of claim 31, wherein said formed includes hot-pressed or stamped with a reflective foil.

35. The tube assembly of claim 31, wherein said formed includes coated or painted with reflective material.

36. The tube assembly of claim 31, wherein said formed includes having a reflective object bonded to said end face.

37. The tube assembly of claim 32, wherein said fluorescent or phosphorescent material is coated or painted on said end face.

38. The tube assembly of claim 32, wherein said fluorescent or phosphorescent material is on an object bonded to, or stamped onto, said end face.

39. The tube assembly of claim 32, wherein said fluorescent or phosphorescent material is imbedded in said end face.

40. The tube assembly of claim 31, wherein said reflectivity is spectrally selective.

41. The tube assembly of claim 31, further comprising an optical filter having spectrally selective transmission and disposed over at least said annular portion.

42. The apparatus of claim 2, wherein said specular reflectivity is spectrally selective.

43. The apparatus of claim 42, wherein said light source emits light in a narrow band of wavelengths.

44. The apparatus of claim 42, further comprising an optical filter having a spectrally selective transmission and disposed in the path of the light transmitted through said second one of said pair of fibers.

45. The system of claim 12, wherein said specular reflectivity is spectrally selective.

46. The system of claim 45, wherein said light source emits light in a narrow band of wavelengths.

47. The system of claim 45, further comprising an optical filter having a spectrally selective transmission and disposed in the path of the light transmitted through said second one of said pair of fibers.

48. The method of claim 22, whereby said specular reflectivity is made to be spectrally selective.

49. The method of claim 48, whereby said light source is made to emit light in a narrow band of wavelengths.

50. The method of claim 48, further comprising the step of providing an optical filter having a spectrally selective transmission and disposing it in the path of the light transmitted through said second one of said pair of fibers.

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